UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

July 24, 1990

Docket No. 50-317

Mr. G. C. Creel
Vice President - Nuclear Energy
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
MD Rts. 2 & 4
P. O. Box 1535
Lusby, Maryland 20657

Dear Mr. Creel:

SUBJECT: ISSUANCE OF AMENDMENT FOR CALVERT CLIFFS NUCLEAR POWER PLANT UNIT 1 (TAC NO. 76130)

The Commission has issued the enclosed Amendment No. 145 to Facility Operating License No. DPR-53 for the Calvert Cliffs Nuclear Power Plant, Unit No. 1. This amendment consists of changes to the Technical Specifications (TS) in response to your application transmitted by letter dated May 14, 1990, as modified on July 18, 1990.

This amendment replaces the existing 0-10 effective full power years (EFPY) and 10-40 EFPY heatup and cooldown curves with 0-12 EFPY heatup and cooldown curves. These curves are based on the final version of Regulatory Guide 1.99, Revision 2, and use Combustion Engineering methodology, which has been previously reviewed and approved. These new calculations resulted in Technical Specification changes to the low temperature overpressure protection (LTOP) controls, the reactor coolant pump (RCP) controls, the high pressure safety injection (HPSI) operability and the HPSI controls which are also reflected in this amendment. Your letter dated July 18, 1990, modified the initial submittal and requested that the Commission handle the proposed amendment, as modified, on an emergency basis. The details relating to the requested changes, the emergency circumstances and a Final Determination of No Significant Hazards Consideration are included in the enclosed Safety Evaluation.

The restrictions imposed by this amendment, relating to the RCP controls, are temporary and are valid for the current shutdown condition. Entry to Mode 2 is prohibited until the restrictions imposed have been revised by a subsequent amendment.

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A Notice of Issuance and Final Determination of No Significant Hazards Consideration and Opportunity for Hearing will be included in the Commission's next regular bi-weekly Federal Register notice.

Sincerely,

ORIGINAL SIGNED BY:

Daniel G. McDonald, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Enclosures:
1. Amendment No.145 to DPR-53
2. Safety Evaluation

cc: w/enclosures
See next page

Distribtuion:

Docket File	GHill(4)
PDI-1 Rdg	Wanda Jones
NRC/Local PDRs	JCalvo
SVarga	ACRS(10)
RWessman	GPA/PA
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CVogan	JLinville
DMcDonald	JTsao
OGC	DHagan
EJordan	MMcCoy
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DOCUMENT NAME: AMEND 76130

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Sincerely,

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Daniel G. McDonald, Senior Project Manager
Project Directorate I-1
Division of Reactor Projects - I/II
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BHehl
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DOCUMENT NAME: AMEND 76130

Mr. G. C. Creel
Baltimore Gas & Electric Company

Calvert Cliffs Nuclear Power Plant

cc:

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Calvert County Board of
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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

BALTIMORE GAS AND ELECTRIC COMPANY

DOCKET NO. 50-317

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 145
License No. DPR-53

1. The Nuclear Regulatory Commission (the Commission) has found that:

    A. The application for amendment by Baltimore Gas and Electric Company (the licensee) dated May 14, 1990, as modified on July 18, 1990, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act) and the Commission's rules and regulations set forth in 10 CFR Chapter I;

    B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

    C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

    D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

    E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment, and paragraph 2.C.2 of Facility Operating License No. DPR-53 is hereby amended to read as follows:

(2) <u>Technical Specifications</u>

The Technical Specifications contained in Appendices A and B, as revised through Amendment No. 145 , are hereby incorporated in the license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of the date of its issuance to be implemented upon receipt.

FOR THE NUCLEAR REGULATORY COMMISSION

RHWessman

Richard Wessman, Acting Assistant Director
for Region I Reactors
Division of Reactor Projects - I/II
Office of Nuclear Reactor Regulation

Attachment:
Changes to the Technical
Specifications

Date of Issuance: July 24, 1990

ATTACHMENT TO LICENSE AMENDMENTS

AMENDMENT NO. FACILITY OPERATING LICENSE NO. DPR-53

DOCKET NO. 50-317

Revise Appendix A as follows:

Remove Pages	Insert Pages
3/4 1-7	3/4 1-7*
3/4 1-8	3/4 1-8
3/4 1-9	3/4 1-9*
3/4 1-10	3/4 1-10
3/4 3-11	3/4 3-11
3/4 3-12	3/4 3-12*
3/4 4-2a	3/4 4-2a
3/4 4-2b	3/4 4-2b
3/4 4-23	3/4 4-23
3/4 4-24	3/4 4-24
3/4 4-24a	3/4 4-24a
3/4 4-25*	3/4 4-25*
3/4 4-26	3/4 4-26
3/4 4-26a	3/4 4-26a
3/4 4-26b	3/4 4-26b
-----	3/4 4-26c
3/4 5-3	3/4 5-3*
3/4 5-4	3/4 5-4
3/4 5-6	3/4 5-6
3/4 5-7	3/4 5-7*
B 3/4 4-1	B 3/4 4-1
B 3/4 4-5	B 3/4 4-5
B 3/4 4-6	B 3/4 4-6
B 3/4 4-7	B 3/4 4-7
B 3/4 4-8	B 3/4 4-8
B 3/4 4-9	B 3/4 4-9
B 3/4 4-10	B 3/4 4-10
B 3/4 4-11	B 3/4 4-11
B 3/4 5-1	B 3/4 5-1*
B 3/4 5-2	B 3/4 5-2
-----	B 3/4 5-2a

* Pages that did not change, but are overleaf.

REACTIVITY CONTROL SYSTEMS

MINIMUM TEMPERATURE FOR CRITICALITY

LIMITING CONDITION FOR OPERATION

3.1.1.5 The Reactor Coolant System lowest operating loop temperature (T_{avg}) shall be $\geq$ 515°F when the reactor is critical.

APPLICABILITY: MODES 1 and 2#.

ACTION:

With a Reactor Coolant System operating loop temperature (T_{avg}) < 515°F, restore T_{avg} to within its limit within 15 minutes or be in HOT STANDBY within the next 15 minutes.

SURVEILLANCE REQUIREMENTS

4.1.1.5 The Reactor Coolant System temperature (T_{avg}) shall be determined to be $\geq$ 515°F:

a. Within 15 minutes prior to achieving reactor criticality, and

b. At least once per 30 minutes when the reactor is critical and the Reactor Coolant System T_{avg} is less than 525°F.

With $K_{eff} \geq 1.0$.

3/4.1.2 BORATION SYSTEMS

FLOW PATHS - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.1 As a minimum, one of the following boron injection flow paths and one associated heat tracing circuit shall be **OPERABLE**:

a. A flow path from the boric acid storage tank via either a boric acid pump or a gravity feed connection and charging pump to the Reactor Coolant System if only the boric acid storage tank in Specification 3.1.2.7a is **OPERABLE**, or

b. The flow path from the refueling water tank via either a charging pump or a high pressure safety injection pump* to the Reactor Coolant System if only the refueling water tank in Specification 3.1.2.7b is **OPERABLE**.

APPLICABILITY: **MODES** 5 AND 6.

ACTION:

With none of the above flow paths **OPERABLE**, suspend all operations involving **CORE ALTERATIONS** or positive reactivity changes until at least one injection path is restored to **OPERABLE** status.

SURVEILLANCE REQUIREMENTS

4.1.2.1 At least one of the above required flow paths shall be demonstrated **OPERABLE**:

a. At least once per 7 days by verifying that the temperature of the heat traced portion of the flow path is above the temperature limit line shown on Figure 3.1-1 when a flow path from the concentrated boric acid tanks is used.

b. At least once per 31 days by verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

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* Below 327°F, the required **OPERABLE** HPSI pump shall be in pull-to-lock and will not start automatically. Below 327°F, HPSI pump use will be conducted in accordance with Technical Specification 3.4.9.3.

FLOW PATHS - OPERATING

LIMITING CONDITION FOR OPERATION

3.1.2.2 At least two of the following three boron injection flow paths and one associated heat tracing circuit shall be **OPERABLE**:

a. Two flow paths from the boric acid storage tanks required to be **OPERABLE** pursuant to Specifications 3.1.2.8 and 3.1.2.9 via either a boric acid pump or a gravity feed connection, and a charging pump to the Reactor Coolant System, and

b. The flow path from the refueling water tank via a charging pump to the Reactor Coolant System.

APPLICABILITY: **MODES** 1, 2, 3 and 4.

ACTION:

With only one of the above required boron injection flow paths to the Reactor Coolant System **OPERABLE**, restore at least two boron injection flow paths to the Reactor Coolant System to **OPERABLE** status within 72 hours or be in at least **HOT STANDBY** and borated to a **SHUTDOWN MARGIN** equivalent to at least 3% $\Delta k/k$ at $200^{o}F$ within the next 6 hours; restore at least two flow paths to **OPERABLE** status within the next 7 days or be in **COLD SHUTDOWN** within the next 30 hours.

SURVEILLANCE REQUIREMENTS

4.1.2.2 At least two of the above required flow paths shall be demonstrated **OPERABLE**:

a. At least once per 7 days by verifying that the temperature of the heat traced portion of the flow path from the concentrated boric acid tanks is above the temperature limit line shown on Figure 3.1-1.

b. At least once per 31 days by verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

c. At least once per refueling interval by verifying on a SIAS test signal that:

(1) each automatic valve in the flow path actuates to its correct position, and

(2) each boric acid pump starts.

CHARGING PUMP - SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.1.2.3 At least one charging pump or one high pressure safety injection pump* in the boron injection flow path required OPERABLE pursuant to Specification 3.1.2.1 shall be OPERABLE and capable of being powered from an OPERABLE emergency bus.

APPLICABILITY: MODES 5 and 6.

ACTION:

With no charging pump or high pressure safety injection pump OPERABLE, suspend all operations involving CORE ALTERATIONS or positive reactivity changes until at least one of the required pumps is restored to OPERABLE status.

SURVEILLANCE REQUIREMENTS

4.1.2.3 No additional Surveillance Requirements other than those required by Specification 4.0.5.

* Below 327°F, the required OPERABLE HPSI pump shall be in pull-to-lock and will not start automatically. Below 327°F, HPSI pump use will be conducted in accordance with Technical Specification 3.4.9.3.

TABLE 3.3-3

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. **SAFETY INJECTION (SIAS)@**					
a. Manual (Trip Buttons)	2	1	2	1, 2, 3, 4	6
b. Containment Pressure - High	4	2	3	1, 2, 3	7*
c. Pressurizer Pressure - Low	4	2	3	1, 2, 3(a)	7*
2. **CONTAINMENT SPRAY (CSAS)**					
a. Manual (Trip Buttons)	2	1	2	1, 2, 3, 4	6
b. Containment Pressure - High	4	2	3	1, 2, 3	11
3. **CONTAINMENT ISOLATION (CIS)#**					
a. Manual CIS (Trip Buttons)	2	1	2	1, 2, 3, 4	6
b. Containment Pressure - High	4	2	3	1, 2, 3	7*

\# Containment isolation of non-essential penetrations is also initiated by SIAS (functional units 1.a and 1.c).

@ When the RCS temperature is:

(a) Greater than 350°F, the required **OPERABLE** HPSI pumps must be able to start automatically upon receipt of a SIAS signal,

(b) Between 350°F and 327°F (inclusive), a transition region exists where the **OPERABLE** HPSI pump will be placed in pull-to-lock on a cooldown and restored to automatic status on a heatup,

(c) Below 327°F, the required **OPERABLE** HPSI pump shall be in pull-to-lock and will not start automatically.

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
4. MAIN STEAM LINE ISOLATION					
a. Manual (MSIV Hand Switches and Feed Head Isolation Hand Switches)	1/valve	1/valve	1/valve	1, 2, 3, 4	6
b. Steam Generator Pressure - Low	4/steam generator	2/steam generator	3/steam generator	1, 2, 3(c)	7*
5. CONTAINMENT SUMP RECIRCULATION (RAS)					
a. Manual RAS (Trip Buttons)	2	1	2	1, 2, 3, 4	6
b. Refueling Water Tank - Low	4	2	3	1, 2, 3	7*

REACTOR COOLANT SYSTEM

COOLANT LOOPS AND COOLANT CIRCULATION

SHUTDOWN

LIMITING CONDITION FOR OPERATION

3.4.1.3
a. At least two of the coolant loops listed below shall be **OPERABLE**:

1. Reactor Coolant Loop #11 and its associated steam generator and at least one associated reactor coolant pump.

2. Reactor Coolant Loop #12 and its associated steam generator and at least one associated reactor coolant pump,

3. Shutdown Cooling Loop #11*,

4. Shutdown Cooling Loop #12*.

b. At least one of the above coolant loops shall be in operation**.

APPLICABILITY: **MODES** 4***# and 5***#.

ACTION:

a. With less than the above required coolant loops **OPERABLE**, initiate corrective action to return the required coolant loops to **OPERABLE** status within one hour or be in **COLD SHUTDOWN** within 24 hours.

b. With no coolant loop in operation, suspend all operations involving a reduction in boron concentration of the Reactor Coolant System and initiate corrective action to return the required coolant loop to operation within one hour.

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* The normal or emergency power source may be inoperable in **MODE** 5.

** All reactor coolant pumps and shutdown cooling pumps may be de-energized for up to 1 hour provided (1) no operations are permitted that would cause dilution of the reactor coolant system boron concentration, and (2) core outlet temperature is maintained at least 10^{O}F below saturation temperature.

*** A reactor coolant pump shall not be started with the RCS temperature less than or equal to 327^{O}F unless (1) the pressurizer water level is less than or equal to 165 inches, and (2) the secondary water temperature of each steam generator is less than or equal to 30^{O}F above the RCS temperature, and (3) the pressurizer pressure is less than or equal to 300 psia by plant computer indication or equivalent precision instrument. These are temporary restrictions and are only valid for the current shutdown condition. Entry into **MODE** 2 will not occur until these restrictions have been revised.

\# See Special Test Exception 3.10.5.

REACTOR COOLANT SYSTEM

COOLANT LOOPS AND COOLANT CIRCULATION

SHUTDOWN

SURVEILLANCE REQUIREMENTS

4.4.1.3.1 The required shutdown cooling loop(s), if not in operation, shall be determined **OPERABLE** once per 7 days by verifying correct breaker alignments and indicated power availability for pumps and shutdown cooling loop valves.

4.4.1.3.2 The required steam generator(s), if it is being used to meet 3.4.1.3.a, shall be determined **OPERABLE** by verifying the secondary side water level to be above -50 inches at least once per 12 hours.

4.4.1.3.3 At least one coolant loop shall be verified to be in operation and circulating reactor coolant at least once per 12 hours.

3/4.4.9 PRESSURE/TEMPERATURE LIMITS

REACTOR COOLANT SYSTEM

LIMITING CONDITION FOR OPERATION

3.4.9.1 The Reactor Coolant System (except the pressurizer) temperature and pressure shall be limited in accordance with the limit lines shown on Figure 3.4-2 during heatup, cooldown, criticality, and inservice leak and hydrostatic testing with:

a. A maximum heatup of:

Maximum Allowable Heatup Rate	RCS Temperature
60°F in any one hour period	70°F to 305°F
10°F in any one hour period	305°F to 327°F
60°F in any one hour period	≥ 327°F

b. A maximum cooldown of 100°F in any one hour period with T_{avg} above 250°F and a maximum cooldown of 20°F in any one hour period with T_{avg} below 250°F.

c. A maximum temperature change of 5°F in any one hour period, during hydrostatic testing operations above system design pressure.

APPLICABILITY: At all times.

ACTION:

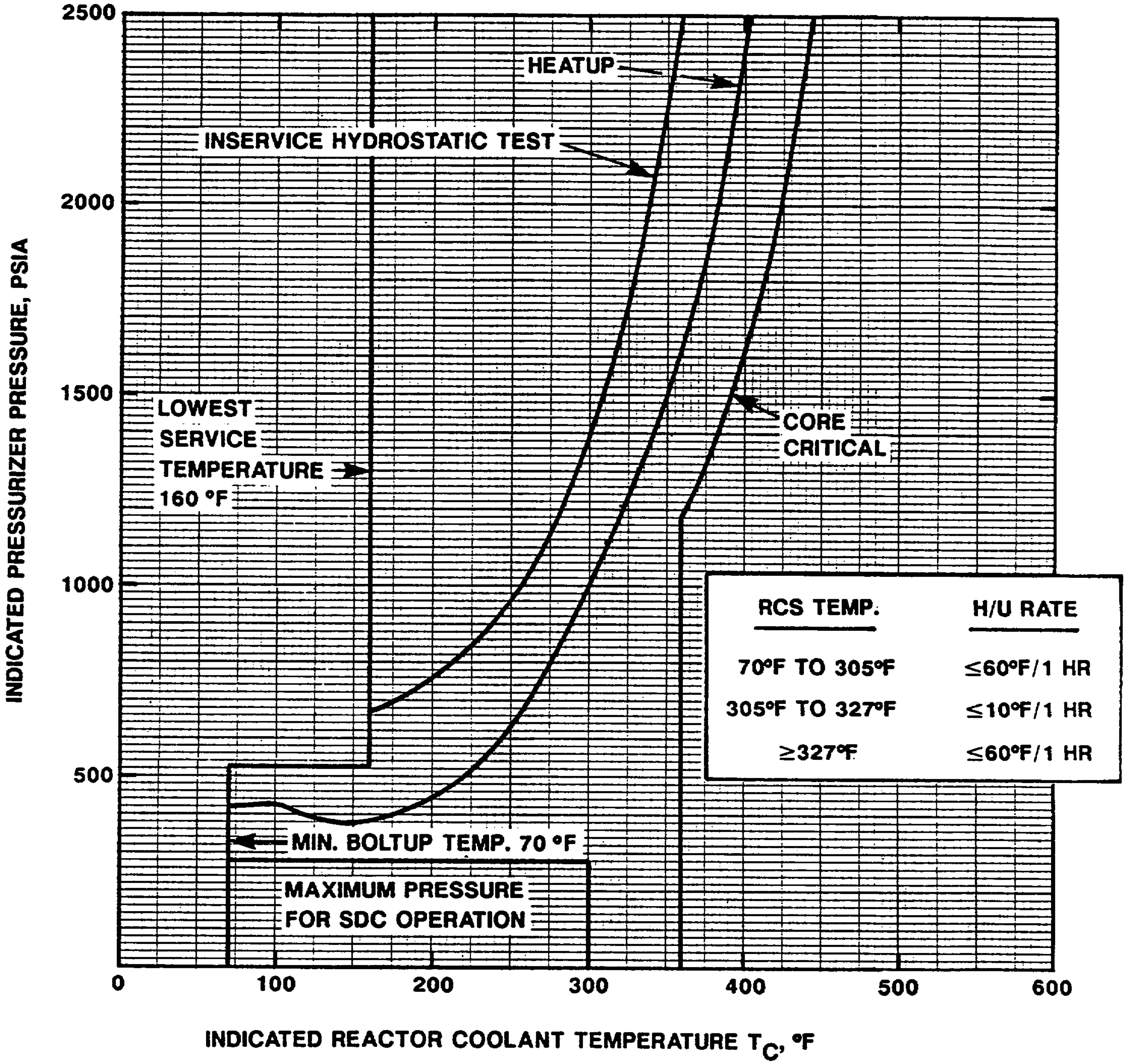
With any of the above limits exceeded, restore the temperature and/or pressure to within the limit within 30 minutes; perform an engineering evaluation to determine the effects of the out-of-limit condition on the fracture toughness properties of the Reactor Coolant System; determine that the Reactor Coolant System remains acceptable for continued operations or be in at least **HOT STANDBY** within the next 6 hours and reduce the RCS T_{avg} and pressure to less than 200°F and 300 psia, respectively, within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.9.1.1 The Reactor Coolant System temperature and pressure shall be determined to be within the limits at least once per 30 minutes during system heatup, cooldown, and inservice leak and hydrostatic testing operations.

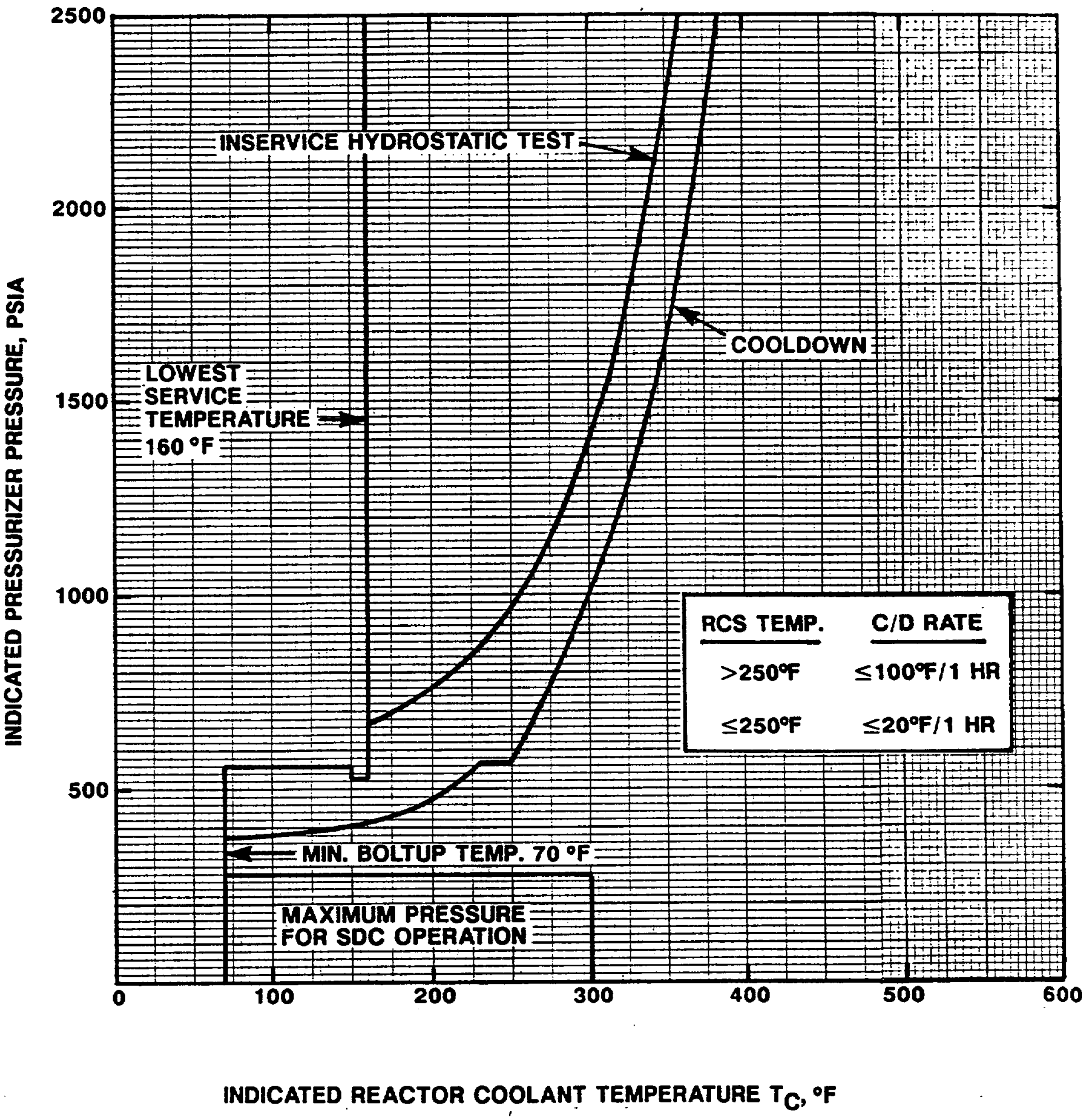
4.4.9.1.2 The reactor vessel material irradiation surveillance specimens shall be removed and examined, to determine changes in material properties, at the intervals shown in Table 4.4-5. The results of these examinations shall be used to update Figure 3.4-2.

FIGURE 3.4-2a
CALVERT CLIFFS UNIT 1 HEATUP CURVE, 12 EFPY
REACTOR COOLANT SYSTEM PRESSURE TEMPERATURE LIMITS



* The minimum boltup temperature is the temperature of the reactor vessel flange, not the coolant temperature.

FIGURE 3.4-2b
CALVERT CLIFFS UNIT 1 COOLDOWN CURVE, 12 EFPY
REACTOR COOLANT SYSTEM PRESSURE TEMPERATURE LIMITS



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* The minimum boltup temperature is the temperature of the reactor vessel flange, not the coolant temperature.

TABLE 4.4-5

REACTOR VESSEL MATERIAL IRRADIATION SURVEILLANCE SCHEDULE

SPECIMEN	REMOVAL INTERVAL
1. Capsule No. 1	5 years
2. Capsule No. 2	14 years
3. Capsule No. 3	23 years
4. Capsule No. 4	30 years
5. Capsule No. 5	35 years
6. Capsule No. 6	40 years

REACTOR COOLANT SYSTEM

PRESSURIZER

LIMITING CONDITION FOR OPERATION

3.4.9.2 The pressurizer temperature shall be limited to:

a. A maximum heatup of 100°F in any one hour period,

b. A maximum cooldown of 200°F in any one hour period, and

c. A maximum spray water temperature differential of 400°F.

APPLICABILITY: At all times.

ACTION:

With the pressurizer temperature limits in excess of any of the above limits, restore the temperature to within the limits within 30 minutes; perform an engineering evaluation to determine the effects of the out-of-limit condition on the fracture toughness properties of the pressurizer; determine that the pressurizer remains acceptable for continued operation or be in at least **HOT STANDBY** within the next 6 hours and reduce the pressurizer pressure to less than 300 psia within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.4.9.2 The pressurizer temperatures shall be determined to be within the limits at least once per 30 minutes during system heatup or cooldown. The spray water temperature differential shall be determined to be within the limit at least once per 12 hours during auxiliary spray operation.

LIMITING CONDITION FOR OPERATION

3.4.9.3 The following overpressure protection requirements shall be met:

a. One of the following three overpressure protection systems shall be in place:

   1. Two power-operated relief valves (PORVs) with a lift setting $\leq$ 424.5 psia or
   2. A single PORV with a lift setting of $\leq$ 424.5 psia and a Reactor Coolant System vent of $\geq$ 1.3 square inches, or
   3. A Reactor Coolant System (RCS) vent $\geq$ 2.6 square inches.

b. Two high pressure safety injection (HPSI) pumps# shall be disabled by either removing (racking out) their motor circuit breakers from the electrical power supply circuit, or by locking shut their discharge valves.

c. The HPSI loop motor operated valves (MOVs)# shall be prevented from automatically aligning HPSI pump flow to the RCS by placing their hand switches in pull-to-override.

d. No more than one **OPERABLE** high pressure safety injection pump with suction aligned to the Refueling Water Tank may be used to inject flow into the RCS and when used, it must be under manual control and one of the following restrictions shall apply:

   1. The total high pressure safety injection flow shall be limited to $\leq$ 210 gpm **OR**
   2. A reactor coolant system vent of $\geq$ 2.6 square inches shall exist.

APPLICABILITY: When the RCS temperature is $\leq$ 327°F and the RCS is vented to < 8 square inches.

ACTION:

a. With one PORV inoperable, either restore the inoperable PORV to **OPERABLE** status within 5 days or depressurize and vent the RCS through a $\geq$ 1.3 square inch vent(s) within the next 48 hours; maintain the RCS in a vented condition until both PORVs have been restored to **OPERABLE** status.

b. With both PORVs inoperable, depressurize and vent the RCS through a $\geq$ 2.6 square inch vent(s) within 48 hours; maintain the RCS in a vented condition until either one **OPERABLE** PORV and a vent of $\geq$ 1.3 square inches has been established or both PORVs have been restored to **OPERABLE** status.

EXCEPT when required for testing.

LIMITING CONDITION FOR OPERATION (Continued)

c. In the event either the PORVs or the RCS vent(s) are used to mitigate a RCS pressure transient, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 30 days. The report shall describe the circumstances initiating the transient, the effect of the PORVs or vent(s) on the transient and any corrective action necessary to prevent recurrence.

d. With less than two HPSI pumps# disabled, place at least two HPSI pump handswitches in pull-to-lock within fifteen minutes <u>and</u> disable two HPSI pumps within the next four hours.

e. With one or more HPSI loop MOVs# not prevented from automatically aligning a HPSI pump to the RCS, immediately place the MOV handswitch in pull-to-override, or shut and disable the affected MOV or isolate the affected HPSI header flowpath within four hours, <u>and</u> implement the action requirements of Specifications 3.1.2.1, 3.1.2.3, and 3.5.3, as applicable.

f. With HPSI flow exceeding 210 gpm while suction is aligned to the RWT and an RCS vent of < 2.6 square inches exists,

   1. Immediately take action to reduce flow to less than or equal to 210 gpm.

   2. Verify the excessive flow condition did not raise pressure above the maximum allowable pressure for the given RCS temperature on Figure 3.4-2a or Figure 3.4-2b.

   3. If a pressure limit was exceeded, take action in accordance with Specification 3.4.9.1.

g. The provisions of specification 3.0.4 are not applicable.

EXCEPT when required for testing.

SURVEILLANCE REQUIREMENTS

4.4.9.3.1 Each PORV shall be demonstrated **OPERABLE** by:

a. Performance of a **CHANNEL FUNCTIONAL TEST** on the PORV actuation channel, but excluding valve operation, within 31 days prior to entering a condition in which the PORV is required **OPERABLE** and at least once per 31 days thereafter when the PORV is required **OPERABLE**.

b. Performance of a **CHANNEL CALIBRATION** on the PORV actuation channel at least once per 18 months.

c. Verifying the PORV isolation valve is open at least once per 72 hours when the PORV is being used for overpressure protection.

d. Testing in accordance with the inservice test requirements for ASME Category C valves pursuant to Specification 4.0.5

4.4.9.3.2 The RCS vent(s) shall be verified to be open at least once per 12 hours* when the vent(s) is being used for overpressure protection.

4.4.9.3.3 All high pressure safety injection pumps, except the above **OPERABLE** pump, shall be demonstrated inoperable at least once per 12 hours by verifying that the motor circuit breakers have been removed from their electrical power supply circuits or by verifying their discharge valves are locked shut. The automatic opening feature of the high pressure safety injection loop MOVs shall be verified disabled at least once per 12 hours.

* Except when the vent pathway is locked, sealed, or otherwise secured in the open position, then verify these vent pathways open at least once per 31 days.

EMERGENCY CORE COOLING SYSTEMS

ECCS SUBSYSTEMS - $T_{avg} \geq 300^{o}F$

LIMITING CONDITION FOR OPERATION

3.5.2 Two independent ECCS subsystems shall be **OPERABLE** with each subsystem comprised of:

a. One **OPERABLE** high-pressure safety injection pump,

b. One **OPERABLE** low-pressure safety injection pump, and

c. An **OPERABLE** flow path capable of taking suction from the refueling water tank on a Safety Injection Actuation Signal and automatically transferring suction to the containment sump on a Recirculation Actuation Signal.

APPLICABILITY: **MODES** 1, 2 and 3*.

ACTION:

a. With one ECCS subsystem inoperable, restore the inoperable subsystem to **OPERABLE** status within 72 hours or be in **HOT SHUTDOWN** within the next 12 hours.

b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

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* With pressurizer pressure $\geq$ 1750 psia.

SURVEILLANCE REQUIREMENTS

4.5.2 Each ECCS subsystem shall be demonstrated **OPERABLE***:

a. At least once per 12 hours by verifying that the following valves are in the indicated positions with power to the valve operators removed:

Valve Number	Valve Function	Valve Position
1. MOV-659	Mini-flow Isolation	Open
2. MOV-660	Mini-flow Isolation	Open
3. CV-306	Low Pressure SI Flow Control	Open

b. At least once per 31 days by:

1. Verifying that upon a Recirculation Actuation Test Signal, the containment sump isolation valves open.

2. Verifying that each valve (manual, power operated or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.

c. By a visual inspection which verifies that no loose debris (rags, trash, clothing, etc.) is present in the containment which could be transported to the containment sump and cause restriction of the pump suctions during LOCA conditions. This visual inspection shall be performed:

1. For all accessible areas of the containment prior to establishing **CONTAINMENT INTEGRITY**, and

2. Of the areas affected within containment at the completion of containment entry when **CONTAINMENT INTEGRITY** is established.

d. Within 4 hours prior to increasing the RCS pressure above 1750 psia by verifying, via local indication at the valve, that CV-306 is open.

* Whenever flow testing into the RCS is required at RCS temperatures below 327°F, the high pressure safety injection pump shall recirculate RCS water (suction from RWT isolated) or the controls of Technical Specification 3.4.9.3 shall apply.

ECCS SUBSYSTEMS - T_{avg} < 300°F

LIMITING CONDITION FOR OPERATION

3.5.3 As a minimum, one ECCS subsystem comprised of the following shall be **OPERABLE**:

a. One# **OPERABLE** high-pressure safety injection pump, and

b. An **OPERABLE** flow path capable of taking suction from the refueling water tank on a Safety Injection Actuation Signal and automatically transferring suction to the containment sump on a Recirculation Actuation Signal.

APPLICABILITY: **MODES** 3* and 4.

ACTION:

a. With no ECCS subsystem **OPERABLE**, restore at least one ECCS subsystem to **OPERABLE** status within 1 hour or be in **COLD SHUTDOWN** within the next 20 hours.

b. In the event the ECCS is actuated and injects water into the Reactor Coolant System, a Special Report shall be prepared and submitted to the Commission pursuant to Specification 6.9.2 within 90 days describing the circumstances of the actuation and the total accumulated actuation cycles to date.

SURVEILLANCE REQUIREMENTS

4.5.3.1 The ECCS subsystem shall be demonstrated **OPERABLE** per the applicable Surveillance Requirements of 4.5.2.

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* With pressurizer pressure < 1750 psia.

\# Between 350°F and 327°F (inclusive), a transition region exists where the **OPERABLE** HPSI pump will be placed in pull-to-lock on a cooldown and restored to automatic status on a heatup. Below 327°F, the required **OPERABLE** HPSI pump shall be in pull-to-lock and will not start automatically. Below 327°F, HPSI pump use will be conducted in accordance with Technical Specification 3.4.9.3.

EMERGENCY CORE COOLING SYSTEM

REFUELING WATER TANK

LIMITING CONDITION FOR OPERATION

3.5.4 The refueling water tank shall be **OPERABLE** with:

a. A minimum contained borated water volume of 400,000 gallons,

b. A boron concentration of between 2300 and 2700 ppm,

c. A minimum water temperature of $40^{o}F$, and

d. A maximum solution temperature of $100^{o}F$ in **MODE** 1.

APPLICABILITY: **MODES** 1, 2, 3 and 4.

ACTION:

With the refueling water tank inoperable, restore the tank to OPERABLE status within 1 hour or be in at least **HOT STANDBY** within 6 hours and in **COLD SHUTDOWN** within the following 30 hours.

SURVEILLANCE REQUIREMENTS

4.5.4 The RWT shall be demonstrated **OPERABLE**:

a. At least once per 7 days by:

1. Verifying the contained borated water volume in the tank, and

2. Verifying the boron concentration of the water.

b. At least once per 24 hours by verifying the RWT temperature when the outside air temperature is < $40^{o}F$.

3/4.4.1 COOLANT LOOPS AND COOLANT CIRCULATION

The plant is designed to operate with both reactor coolant loops and associated reactor coolant pumps in operation, and maintain DNBR above 1.195 during all normal operations and anticipated transients.

A single reactor coolant loop with its steam generator filled above the low level trip setpoint provides sufficient heat removal capability for core cooling while in **MODES** 2 and 3; however, single failure considerations require plant shutdown if component repairs and/or corrective actions cannot be made within the allowable out-of-service time.

In **MODES** 4 and 5, a single reactor coolant loop or shutdown cooling loop provides sufficient heat removal capability for removing decay heat; but single failure considerations require that at least two loops be **OPERABLE**. Thus, if the reactor coolant loops are not **OPERABLE**, this specification requires two shutdown cooling loops to be **OPERABLE**.

The operation of one Reactor Coolant Pump or one shutdown cooling pump provides adequate flow to ensure mixing, prevent stratification and produce gradual reactivity changes during boron concentration reductions in the Reactor Coolant System. The reactivity change rate associated with boron reductions will, therefore, be within the capability of operator recognition and control.

The restrictions on starting a Reactor Coolant Pump during **MODES** 4 and 5 with the RCS temperature $\leq 327^{\circ}F$ are provided to prevent RCS pressure transients, caused by energy additions from the secondary system, which could exceed the limits of Appendix G to 10 CFR Part 50 (see Bases 3/4.4.9). For operation of the reactor coolant pumps during the summer/fall 1990 outage and the associated low decay heat load (shutdown for at least 60 days) the following criteria apply: (1) restricting the water volume in the pressurizer and thereby providing a volume for the primary coolant to expand into and (2) by restricting starting of the RCPs to when the indicated secondary water temperature of each steam generator is less than or equal to $30^{\circ}F$ above the Reactor Coolant System temperature, (3) limit the initial indicated pressure of the pressurizer to less than or equal to 300 psia by plant computer indication or equivalent precision instrument.

3/4.4.2 SAFETY VALVES

The pressurizer code safety valves operate to prevent the RCS from being pressurized above its Safety Limit of 2750 psia. Each safety valve is designed to relieve approximately 3×10^5 lbs per hour of saturated steam at the valve setpoint. The relief capacity of a single safety valve is adequate to relieve any overpressure condition which could occur during shutdown. In the event that no safety valves are **OPERABLE**, an operating shutdown cooling loop, connected to the RCS, provides overpressure relief capability and will prevent RCS overpressurization.

During operation, all pressurizer code safety valves must be OPERABLE to prevent the RCS from being pressurized above its safety limit of 2750 psia. The combined relief capacity of these valves is sufficient to steam generator tube rupture accident in conjunction with an assumed steady state primary-to-secondary steam generator leakage rate of 1.0 gpm and a concurrent loss of offsite electrical power. The values for the limits on specific activity represent interim limits based upon a parametric evaluation by the NRC of typical site locations. These values are conservative in that specific site parameters of the Calvert Cliffs site, such as site boundary location and meteorological conditions, were not considered in this evaluation. The NRC is finalizing site specific criteria which will be used as the basis for the reevaluation of the specific activity limits of this site. This reevaluation may result in higher limits.

The **ACTION** statement permitting **POWER OPERATION** to continue for limited time periods with the primary coolant's specific activity >1.0 uCi/gram **DOSE EQUIVALENT** I-131, but within the allowable limit shown on Figure 3.4-1, accommodates possible iodine spiking phenomenon which may occur following changes in **THERMAL POWER**. Operation with specific activity levels exceeding 1.0 uCi/gram **DOSE EQUIVALENT** I-131 but within the limits shown on Figure 3.4-1 must be restricted to no more than 10 percent of the unit's yearly operating time since the activity levels allowed by Figure 3.4-1 increase the 2 hour thyroid dose at the site boundary by a factor of up to 20 following a postulated steam generator tube rupture.

Reducing T_{avg} to < 500°F prevents the release of activity should a steam generator tube rupture since the saturation pressure of the primary coolant is below the lift pressure of the atmospheric steam relief valves. The surveillance requirements provide adequate assurance that excessive specific activity levels in the primary coolant will be detected in sufficient time to take corrective action. Information obtained on iodine spiking will be used to assess the parameters associated with spiking phenomena. A reduction in frequency of isotopic analyses following power changes may be permissible if justified by the data obtained.

3/4.4.9 PRESSURE/TEMPERATURE LIMITS

Operation within the appropriate heatup and cooldown curves assures the integrity of the reactor vessel against fracture induced by combinative thermal and pressure stresses. As the vessel is subjected to increasing fluence, the toughness of the limiting material continues to decline, and ever more restrictive Pressure/Temperature limits must be observed. The current limits, Figures 3.4-2a and 3.4-2b, are for up to and including 12 Effective Full Power Years (EFPY) of operation.

The shift in the material fracture toughness, as represented by RT_{NDT}, is calculated using Regulatory Guide 1.99, Revision 2. For 12 EFPY, at the 1/4 T position, the adjusted reference temperature (ART) value is 222°F. At the 3/4 T position the ART value is 162.5°F. These values are used with procedures developed in the ASME Boiler and Pressure Vessel Code, Section III, Appendix G to calculate heatup and cooldown limits in accordance with the requirements of 10 CFR Part 50, Appendix G.

To develop composite pressure-temperature limits for the heatup transient, the isothermal, 1/4 T heatup, and 3/4 T heatup pressure-temperature limits are compared for a given thermal rate. Then the most restrictive pressure-temperature limits are combined over the complete temperature interval resulting in a composite limit curve for the reactor vessel beltline for the heatup event.

To develop a composite pressure-temperature limit for the cooldown event, the isothermal pressure-temperature limit must be calculated. The isothermal pressure-temperature limit is then compared to the pressure-temperature limit associated with a cooling rate and the more restrictive allowable pressure-temperature limit is chosen resulting in a composite limit curve for the reactor vessel beltline.

Both 10 CFR Part 50 Appendix G and ASME, Code Appendix G require the development of pressure-temperature limits which are applicable to inservice hydrostatic tests. The minimum temperature for the inservice hydrostatic test pressure can be determined by entering the curve at the test pressure (1.1 times normal operating pressure) and locating the corresponding temperature. This curve is shown for 12 EFPY on Figures 3.4-2a and 3.4-2b.

Similarly, 10 CFR Part 50 specifies that core critical limits be established based on material considerations. This limit is shown on the heatup curve, Figure 3.4-2a. Note that this limit does not consider the core reactivity safety analyses that actually control the temperature at which the core can be brought critical.

The Lowest Service Temperature is the minimum allowable temperature at pressures above 20% of the pre-operational system hydrostatic test pressure (625 psia). This temperature is defined as equal to the most limiting RT_{NDT} for the balance of the Reactor Coolant System components plus 100°F, per Article NB 2332 of Section III of the ASME Boiler and Pressure Vessel Code.

The horizontal line between the minimum boltup temperature and the Lowest Service Temperature is defined by the ASME Boiler and Pressure Vessel Code as 20% of the pre-operational hydrostatic test pressure. The change in the line at 150°F on the cooldown curve is due to a cessation of RCP flow induced pressure deviation, since no RCPs are permitted to operate during a cooldown below 150°F.

The minimum boltup temperature is the minimum allowable temperature at pressures below 20% of the pre-operational system hydrostatic test pressure. The minimum is defined as the initial RT_{NDT} for the material of the higher stressed region of the reactor vessel plus any effects for irradiation per Article G-2222 of Section III of the ASME Boiler and Pressure Vessel Code. The initial reference temperature of the reactor vessel and closure head flanges was determined using the certified material test reports and Branch Technical Position MTEB 5-2. The maximum initial RT_{NDT} associated with the stressed region of the closure head flange is $-10^{o}F$. The minimum boltup temperature including temperature instrument uncertainty is $-10^{o}F + 10^{o}F = 0^{o}F$. However, for conservatism, a minimum boltup temperature of $70^{o}F$ is utilized.

The design basis events in the low temperature region assuming a water solid system are:

- A RCP start with hot steam generators; and,
- An inadvertent HPSI actuation with concurrent charging.

Any measures which will prevent or mitigate the design basis events are sufficient for any less severe incidents. Therefore, this section will discuss the results of the RCP start and mass addition transient analyses. Also discussed is the effectiveness of a pressurizer steam bubble and a single PORV relative to mitigating the design basis events.

The RCP start transient is a severe LTOP challenge for a water solid RCS. Therefore, during water solid operations all 4 RCPs are tagged out of service. Analysis indicates the transient is adequately controlled by restricting initial pressurizer pressure and level, and by the secondary-to-primary system temperature difference. To avoid opening the PORV, indicated initial pressurizer pressure shall be no more than 300 psia (320 psia, actual) for RCP starts. Indicated pressurizer level shall be no more than 165 inches, based on an actual level of 190 inches, or 737 ft^3 steam volume. The indicated secondary-to-primary system temperature difference shall be no more than $30^{o}F$, ($50^{o}F$ actual).

The inadvertent actuation of one HPSI pump in conjunction with one charging pump is the most severe mass addition overpressurization event. Analyses were performed for a single HPSI pump and one charging pump assuming one PORV available with the existing orifice area of 1.29 in^2. For the limiting case, only a single PORV is considered available due to single failure criteria. A figure was developed which shows the calculated RCS pressures versus time that will occur assuming HPSI and charging pump mass inputs, and the expansion of the RCS following loss of decay heat removal. Sufficient overpressure protection results when the equilibrium pressure does not exceed the limiting Appendix G curve pressure. Because the equilibrium pressure exceeds the Appendix G limit for full HPSI flow, HPSI flow is throttled to no more than 210 gpm indicated when the HPSI pump is used for mass addition. The HPSI flow limit includes allowances for instrumentation uncertainty, charging pump flow addition and RCS expansion following loss of decay heat removal. The HPSI flow is injected through only one HPSI loop MOV to limit instrumentation uncertainty. No more than one charging pump (44 gpm) is allowed to operate during the HPSI mass addition.

Comparison of the PORV discharge curve with the critical pressurizer pressure of 424.5 psia indicates that adequate protection is provided by a single PORV for RCS temperatures above 70°F when all mass input is limited to 380 gpm. HPSI discharge is limited to 210 gpm to allow for one charging pump and system expansion due to loss of decay heat removal.

To provide single failure protection against a HPSI pump mass addition transient, the HPSI loop MOV handswitches must be placed in pull-to-override so the valves do not automatically actuate upon receipt of a SIAS signal. Alternative actions, described in the ACTION STATEMENT, are to disable the affected MOV (by racking out its motor circuit breaker or equivalent), or to isolate the affected HPSI header. Examples of HPSI header isolation actions include; (1) de-energizing and tagging shut the HPSI header isolation valves; (2) locking shut and tagging all three HPSI pump discharge MOVs; and (3) disabling all three HPSI pumps.

Three 100% capacity HPSI pumps are installed at Calvert Cliffs. Procedures will require that two of the three HPSI pumps be disabled (breakers racked out) at RCS temperatures less than or equal to 327°F and that the remaining HPSI pump handswitch be placed in pull-to-lock. Additionally, the HPSI pump normally in pull-to-lock shall be throttled to less than or equal to 210 gpm when used to add mass to the RCS. Exceptions are provided for ECCS testing and for response to LOCAs.

A pressurizer steam volume and a single PORV will provide satisfactory control of all mass addition transients with the exception of a spurious actuation of full flow from a HPSI pump. Overpressurization due to this transient will be precluded for temperatures below 327°F by disabling two HPSI pumps, placing the third in pull-to-lock, and by throttling the third pump to less than or equal to 210 gpm flow when it is used to add mass to the RCS.

Note that only the design bases events are discussed in detail since the less severe transients are bounded by the RCP start and inadvertent HPSI actuation analysis.

RCS temperature, as used in the applicability statement, is determined as follows: (1) with the RCPs running, the RCS cold leg temperature is the appropriate indication, (2) with the shutdown cooling system in operation, the shutdown cooling temperature indication is appropriate, (3) if neither the RCPs or shutdown cooling is in operation, the core exit thermocouples are the appropriate indicators of RCS temperature.

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3/4.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

BASES

3/4.5.1 SAFETY INJECTION TANKS

The **OPERABILITY** of each of the RCS safety injection tanks ensure that a sufficient volume of borated water will be immediately forced into the rector core through each of the cold legs in the event the RCS pressure falls below the pressure of the safety injection tanks. This initial surge of water into the core provides the initial cooling mechanism during large RCS pipe ruptures.

The limits on safety injection tank volume, boron concentration and pressure ensure that the assumptions used for safety injection tank injection in the accident analysis are met.

The safety injection tank power operated isolation valves are considered to be "operating bypasses" in the context of IEEE Std. 279-1971, which requires that bypasses of a protective function be removed automatically whenever permissive conditions are not met. In addition, as these safety injection tank isolation valves fail to meet single failure criteria, removal of power to the valves is required.

The limits for operation with a safety injection tank inoperable for any reason except an isolation valve closed minimizes the time exposure of the plant to a LOCA event occurring concurrent with failure of an additional safety injection tank which may result in unacceptable peak cladding temperatures. If a closed isolation valve cannot be immediately opened, the full capability of one safety injection tank is not available and prompt action is required to place the reactor in a mode where this capability is not required.

3/4.5.2 and 3/4.5.3 ECCS SUBSYSTEMS

The **OPERABILITY** of two separate ECCS subsystems ensures that sufficient emergency core cooling capability will be available in the event of a LOCA assuming the loss of one subsystem through any single failure consideration. Either subsystem operating in connection with the safety injection tanks is capable of supplying sufficient core cooling to limit the peak cladding temperatures within acceptable limits for all postulated break sizes ranging from the double ended break of the largest RCS cold leg pipe downward. In addition, each ECCS subsystem provides long term core cooling capability in the recirculation mode during the accident recovery period.

Portions of the low pressure safety injection (LPSI) system flowpath are common to both subsystems. This includes the low pressure safety injection flow control valve, CV-306, the flow orifice downstream of CV-306, and the four low pressure safety injection loop isolation valves. Although the portions of the flowpath are common, the system design is adequate to ensure reliable ECCS operation due to the short period of LPSI system operation following a design Loss of Coolant Incident prior to recirculation. The LPSI system design is consistent with the assumptions in the safety analysis.

The trisodium phosphate dodecahydrate (TSP) stored in dissolving baskets located in the containment basement is provided to minimize the possibility of corrosion cracking of certain metal components during operation of the ECCS following a LOCA. The TSP provides this protection by dissolving in the sump water and causing its final pH to be raised to $\geq$ 7.0. The requirement to dissolve a representative sample of TSP in a sample of RWT water provides assurance that the stored TSP will dissolve in borated water at the postulated post LOCA temperatures.

The Surveillance Requirements provided to ensure **OPERABILITY** of each component ensure that as a minimum, the assumptions used in the safety analyses are met and the subsystem **OPERABILITY** is maintained. The surveillance requirement for flow balance testing provides assurance that proper ECCS flows will be maintained in the event of a LOCA. Maintenance of proper flow resistance and pressure drop in the piping system to each injection point is necessary to: (1) prevent total pump flow from exceeding runout conditions when the system is in its minimum resistance configuration, (2) provide the proper flow split between injection points in accordance with the assumptions used in the ECCS-LOCA analyses, and (3) provide an acceptable level of total ECCS flow to all injection points equal to or above that assumed in the ECCS-LOCA analyses. Minimum HPSI flow requirements for temperatures above 327^{o}F are based upon small break LOCA calculations which credit charging pump flow following an SIAS. Surveillance testing includes allowances for instrumentation and system leakage uncertainties. The 470 gpm requirement for minimum HPSI flow from the three lowest flow legs includes instrument uncertainties but not system check valve leakage. The **OPERABILITY** of the charging pumps and the associated flow paths is assured by the Boration System Specification 3/4.1.2. Specification of safety injection pump total developed head ensures pump performance is consistent with safety analysis assumptions.

At temperatures below 327^{o}F, HPSI injection flow is limited to less than or equal to 210 gpm except in response to excessive reactor coolant leakage. With excessive RCS leakage (LOCA), make-up requirements could exceed 210 gpm. Overpressurization is prevented by controlling other parameters, such as RCS pressure and subcooling. This provides overpressure protection in the low temperature region. An analysis has been performed which shows this flow rate is more than adequate to meet core cooling safety analysis assumptions. HPSIs are not required to auto-start when the RCS is in the MPT enable condition. The Safety Injection Tanks provide immediate injection of borated water into the core in the event of an accident, allowing adequate time for an operator to take action to start a HPSI.

Surveillance testing of HPSI pumps is required to ensure pump operability. Some surveillance testing requires that the HPSI pumps deliver flow to the RCS. To allow this testing to be done without increasing the potential for overpressurization of the RCS, either the RWT must be isolated or the HPSI pump flow must be limited to less than or equal to 210 gpm or an RCS vent greater than 2.6 square inches must be provided.

3/4.5.4 REFUELING WATER TANK (RWT)

The **OPERABILITY** of the RWT as part of the ECCS ensures that a sufficient supply of borated water is available for injection by the ECCS in the event of a LOCA. The limits on RWT minimum volume and boron concentration ensure that 1) sufficient water is available within containment to permit recirculation cooling flow to the core, and 2) the reactor will remain subcritical in the cold condition following mixing of the RWT and the RCS water volumes with all control rods inserted except for the most reactive control assembly. These assumptions are consistent with the LOCA analyses.

The contained water volume limit includes an allowance for water not usable because of tank discharge line location or other physical characteristics.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO AMENDMENT NO. 145 TO FACILITY OPERATING LICENSE NO. DPR-53

BALTIMORE GAS AND ELECTRIC COMPANY

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT 1

DOCKET NO. 50-317

1.0 INTRODUCTION

By letter dated May 14, 1990, as modified on July 18, 1990, the Baltimore Gas and Electric Company (the licensee) proposed to amend the Technical Specifications of the Calvert Cliffs Nuclear Power Plant, Unit 1. In its submittal, the licensee provided Technical Specification changes to support 10 CFR Part 50, Appendix G, heatup and cooldown Pressure/Temperature (P/T) limits applicable to the Unit 1 reactor vessel for a period up to 12 effective full power years (EFPY).

The proposed P/T limits were developed based on Regulatory Guide (RG) 1.99, Revision 2. The proposed revision provides up-to-date P/T limits for the operation of the reactor coolant system during heatup, cooldown, criticality, and inservice hydrostatic testing. In addition, the proposed changes included revised heatup rates, a change in the Power Operated Relief Valve (PORV) pressure setpoint for Low Temperature Overpressure Protection (LTOP), a change in the LTOP enable temperature, a modification to Reactor Coolant Pump (RCP) controls when in LTOP conditions, a modification to High Pressure Safety Injection (HPSI) pump controls when in LTOP conditions, and changes to the Bases for the affected Limiting Conditions for Operation (LCOs) to justify the changes. The staff evaluation included a review of the Calvert Cliffs Unit 1 LTOP system description provided as in the licensee's letter dated May 14, 1990, and updated in the July 18, 1990, submittal.

To evaluate the P/T limits and supporting changes, the staff used the following NRC regulations and guidance: Appendices G and H to 10 CFR Part 50; the American Society of Testing Materials (ASTM) Standards and the American Society of Mechanical Engineers (ASME) Code, which are referenced in Appendices G and H; 10 CFR Part 50.36(c)(2); RG 1.99, Rev. 2; Standard Review Plan (SRP) Sections 5.2.2 and 5.3.2; and Generic Letter 88-11.

Each licensee authorized to operate a nuclear power reactor is required by 10 CFR 50.36 to provide Technical Specifications for the operation of the plant. In particular, 10 CFR 50.36(c)(2) requires that limiting conditions of operation be included in the Technical Specifications. The P/T limits are among the limiting conditions of operation in the Technical Specifications for all commercial nuclear plants in the United States. Appendices G and H of 10 CFR Part 50 describe specific requirements for fracture toughness and reactor vessel material surveillance that must be considered in setting P/T limits. An acceptable method for constructing the P/T limits is described in SRP Section 5.3.2.

Appendix G of 10 CFR Part 50 specifies fracture toughness and testing requirements for reactor vessel materials in accordance with the ASME Code and, in particular, that the beltline materials in the surveillance capsules be tested in accordance with Appendix H of 10 CFR Part 50. Appendix H, in turn, refers to ASTM Standards. These tests define the extent of vessel embrittlement at the time of capsule withdrawal in terms of the increase in reference temperature. Appendix G also requires the licensee to predict the effects of neutron irradiation on vessel embrittlement by calculating the adjusted reference temperature (ART) and Charpy upper shelf energy (USE). Generic Letter 88-11 requested that licensees and permittees use the methods in RG 1.99, Revision 2, to predict the effect of neutron irradiation on reactor vessel materials. This guide defines the ART as the sum of unirradiated reference temperature, the increase in reference temperature resulting from neutron irradiation, and a margin to account for uncertainties in the prediction method.

Appendix H of 10 CFR Part 50 requires that the licensee establish a surveillance program to periodically withdraw surveillance capsules from the reactor vessel. Appendix H refers to the ASTM Standards which, in turn, require that the capsules be installed in the vessel before initial plant startup and that they contain test specimens made from plate, weld, and heat-affected-zone (HAZ) materials of the reactor beltline.

LTOP is provided by the PORVs on the pressurizer. These PORVs are set at a pressure low enough to prevent violation of the 10 CFR 50 Appendix G P/T limits during heatup and cooldown should a reactor coolant system (RCS) pressure transient occur during low temperature operations. The potential for overpressurization of the RCS can be minimized by a combination of administrative procedures and operator action. However, because operator action cannot always be assumed, and because possible equipment malfunctions must be considered, additional controls must be in place to ensure adequate protection exists for all postulated events.

The two major concerns for LTOP protection are the mass addition and energy addition transients. The proposed amendment provides restrictions on the use of high pressure safety injection (HPSI) pumps to provide protection for mass addition transients. Restrictions are also imposed on the starting and use of the reactor coolant pumps (RCP) to provide protection for energy addition transients.

The licensee's July 18, 1990, submittal addressed concerns related to the assumptions used for the opening time for the pressurizer PORVs when performing the analysis for the LTOP protection portion of the amendment request. The licensee performed additional analysis and confirmatory testing to assure that the opening time assumed for the Calvert Cliffs, Unit 1, PORVs was adequate to support the initial amendment request. The results of the additional analysis and confirmatory tests indicated that no changes were required to the initial amendment request in relation to the opening time of the PORVS. However, as the result of resolving the PORV concern, the licensee performed a re-evaluation of the previous LTOP mass addition and energy addition transient analyses. As the result of this effort, non-conservative assumptions and errors were identified.

2.0 Changes to the Initial Amendment Request

The licensee's July 18, 1990 submittal modified those portions of the initial amendment request pertaining to the LTOP controls for the HPSI and RCPs.

The results of the re-evaluation of the mass addition transient analysis resulted in changes to total limiting flow and the maximum allowed HPSI pump flow. The initial submittal did not consider critical flow effects which limit the capability of the PORVs to relieve pressure during a mass addition transient and result in a change to the allowable HPSI pump flow. In addition, higher decay heat loads were considered during the re-analysis which resulted in an increase in the reactor coolant expansion following a loss of shutdown cooling. Subsequently, the HPSI flow must also be reduced by a corresponding amount. The licensee also based the decay heat load on a minimum time to cooldown to an LTOP condition from a previously assumed 2 days to 2 hours.

As a result of these more conservative assumptions (critical flow considerations, higher decay heat loads, and shorter cooldown time), the total flow changed from 470 gpm to 380 gpm and the maximum allowed HPSI pump flow from 350 gpm to 210 gpm.

The results of the re-evaluation of the energy addition transient resulted in changes to the secondary-to-primary delta T and pressurizer level. In addition, a limit on pressurizer pressure (not previously proposed) is imposed. These limits are required prior to the starting of an RCP. The changes were the result of errors identified during the re-evaluation relating to inputs to a RETRAN computer calculation for pressurizer level. A non-conservative level value was used; non-conservative steam generator heat transfer coefficients identified; and a non-conservative value for thermal expansion of the reactor coolant, due to decay heat loads, had been used.

The new, more restrictive RCP start criteria resulting from the re-evaluation, correcting the problems identified above, resulted in: changing the initial pressurizer level from 170 inches to 165 inches; secondary-to-primary temperature from less than 150°F to less than or equal to 30°F; and adding a requirement for the pressurizer pressure to less than or equal to 300 psia.

These more restrictive RCP start criteria are temporary restrictions and are only valid for the current shutdown condition and do not allow entry into MODE 2 until the restrictions have been revised. This restriction from entry into MODE 2 is included in proposed TS 3.4.1.3 as a footnote on the applicability.

The supplemental information provided in the licensee's July 18, 1990 submittal is included in our evaluation of the proposed changes to the LTOP as detailed in Section 4.0 of this SE. The information provided in the supplement superseded portions of the initial proposed TS changes relative to LTOP as noticed in the Federal Register on May 30, 1990 (55 FR 21962). We have addressed the licensee's request to handle this amendment, as the result of the re-evaluation and its impact on the restart of the unit, as an emergency in Section 5.0 of this SE. We have also made a Final Determination of No Significant Hazards Consideration in Section 7.0 of this SE regarding proposed TS changes related to LTOP which were revised after the initial notice.

3.0 EVALUATION - APPENDIX G HEATUP AND COOLDOWN P/T LIMITS

The staff evaluated the effect of neutron irradiation embrittlement on each beltline material in the Calvert Cliffs 1 reactor vessel. The amount of irradiation embrittlement was calculated in accordance with RG 1.99, Rev. 2. The staff has determined that the material with the highest ART at 12 EFPY was the intermediate shell weld with 0.21% copper (Cu), 0.87% nickel (Ni), and an initial RT_{ndt} of -50°F.

The licensee has removed one surveillance capsule from Calvert Cliffs 1. The results from capsule 263 were published in a Battelle-Columbus Laboratories report. All surveillance capsules contained Charpy impact specimens and tensile specimens made from base metal, weld metal, and HAZ metal.

For the limiting beltline material, the intermediate shell weld, the staff calculated the ART to be 222.3°F at 1/4T (T = reactor vessel beltline thickness) and 162.5°F for 3/4T at 12 EFPY. The staff used a neutron fluence of 1.15E19 n/cm^2 at 1/4T and 4.08E18 n/cm^2 at 3/4T. The ART was determined by Section 1 of RG 1.99, Rev. 2, because only one surveillance capsule has been removed from the reactor vessel.

The licensee used the method in RG 1.99, Rev. 2, to calculate an ART of 222°F at 12 EFPY at 1/4T for the same limiting weld metal. The staff judges that a difference of 0.3°F between the licensee's ART of 222°F and the staff's ART of 222.3°F is acceptable. Substituting the ART of 222.3°F into equations in SRP 5.3.2, the staff verified that the proposed P/T limits for heatup, cooldown, and inservice hydrostatic test meet the beltline material requirements in Appendix G of 10 CFR Part 50.

In addition to beltline materials, Appendix G of 10 CFR Part 50 also imposes P/T limits based on the reference temperature for the reactor vessel closure flange materials. Section IV.2 of Appendix G states that when the pressure exceeds 20% of the preservice system hydrostatic test pressure, the temperature of the closure flange regions highly stressed by the bolt preload must exceed the reference temperature of the material in those regions by at least 120°F for normal operation and by 90°F for hydrostatic pressure tests and leak tests. Based on the flange reference temperature of -10°F, the staff has determined that the proposed P/T limits satisfy Section IV.2 of Appendix G.

Section IV.B of Appendix G requires that the predicted Charpy USE at end of life be above 50 ft-lb. The unirradiated USE for lower shell course plate D-7207-1 was 77 ft-lb. Using Figure 2 of RG 1.99, Rev. 2, the staff determined that the EOL USE would be 52.7 ft-lb. This is greater than 50 ft-lb and, therefore, is acceptable.

The staff has determined that the proposed P/T limits for the reactor coolant system for heatup, cooldown, inservice hydrostatic test, leak test, and criticality are valid through 12 EFPY because the limits conform to the requirements of Appendices G and H of 10 CFR Part 50. The licensee's submittal also satisfies Generic Letter 88-11 because the licensee used the method in RG 1.99, Revision 2, to calculate the ART. Hence, the proposed P/T limits may be incorporated into the Calvert Cliffs 1 Technical Specifications.

4.0 EVALUATION -- LTOP

A new LTOP setpoint, a new enable temperature, and new heatup rates are proposed for the Calvert Cliffs Unit 1 Technical Specifications to accommodate the more restrictive P/T limits. Revised LTOP setpoints and the heatup rates were chosen to prevent violation of the Appendix G P/T limits should an RCS pressure transient occur during low temperature operations. In order to accomplish this, the LTOP pressure setpoint will be lowered, the enable temperature will be increased, and in general, heatup will be slowed, i.e., the rates reduced, for specified RCS temperature ranges.

LTOP is provided by the PORVs on the pressurizer. These PORVs are set to open at a pressure low enough to prevent violation of the Appendix G heatup and cooldown curves should an RCS pressure transient occur during low temperature operations. The licensee's submittal provided the results of analyses of the most limiting overpressure transients used in determining the PORV setpoint for LTOP. The PORV setpoint limit has been set by two design criteria. These are the limiting transients for mass addition and energy addition.

Peak pressures resulting from mass addition transients were calculated by the licensee to determine the effect of inadvertent actuation of combinations of HSPI pumps and charging pumps. The design basis event assuming a water solid RCS is an inadvertent HPSI actuation with concurrent charging pump injection. Based on an assumed single failure of one PORV and the remaining PORV discharging against a backpressure of 115 psia, the calculated RCS pressure for a total mass input of 380 gpm would be 424.5 psia (as measured in the pressurizer).

The limiting energy addition transient is the startup of an RCP while steam generator secondary temperature is greater than the primary coolant temperature. An RCP startup in one loop with a steam generator primary to secondary temperature difference of less than or equal to 30°F and a bubble in the pressurizer was modeled by the licensee using the RETRAN computer code and calculated results demonstrated that the peak pressure would be less than the PORV lift setpoint. Current Calvert Cliffs Technical Specifications specify conditions under which an RCP may not be started, which include conditions corresponding to LTOP. To be within the limiting condition, the pressurizer indicated water level is administratively controlled to maintain an adequate steam bubble for mitigating the energy addition transient and the startup of an RCP is restricted to when the secondary temperature is less than or equal to 30°F above the RCS temperature and the initial pressurizer pressure is less than or equal to 300 psia. Revisions to numerical values in the applicable Technical Specifications have been proposed to be consistent with the assumptions in the reanalysis of the coolant pump startup transient.

In addition to the PORV setpoint change, the LTOP enable temperature is raised from 275°F to 327°F. This change is a result of following the guidance provided in SRP 5.2.2, Revision 2. The SRP considers the enable temperature as the water temperature corresponding to a metal temperature at the reactor vessel beltline that is controlling in the Appendix G calculation.

Below 327°F, the anticipated low temperature overpressurization transients may be adequately mitigated by the automatic action of the pressurizer PORVs or by allowing sufficient time for operator response. Based on the results of the most limiting LTOP transient, the licensee proposed Technical Specification PORV setpoint is less than or equal to 424.5 psia when RCS average temperature is less than or equal to 327°F. The licensee proposed PORV setpoint and enable temperature changes in proposed Technical Specification 3.4.9.3, the heatup rates identified by proposed Technical Specification 3.4.9.1 and the associated Bases section reflect the above discussed LTOP considerations. The staff finds that they are based on approved regulatory guidance, are reasonably conservative and are acceptable.

The new LTOP limits and supporting analyses require that other Technical Specifications be revised to reflect the analysis assumptions. These are the specifications related to HPSI pump operability and RCP controls (discussed earlier under energy addition limits). The PORV setpoint of 424.5 psia was based on an analysis of a mass addition transient from a total mass input of 380 gpm. This mass input considers one HPSI pump injecting at 210 gpm combined with a charging pump injecting at 45 gpm and accounting for system expansion given the current low level of core decay heat. To meet the limiting condition, overpressurization will be precluded for temperatures below 327°F by disabling two HPSI pumps, placing the third in pull-to-lock, and by throttling the third pump to 210 gpm flow when it is used to add mass to the RCS.

Technical Specification 3.4.9.3, "OVERPRESSURE PROTECTION SYSTEMS," identifies the overpressure protection requirements to be met to ensure that Appendix G limits are maintained. The LCO is revised to identify the proposed PORV lift point setting of 424.5 psia, the LTOP enable temperature of 327°F, the overpressure requirements for HPSI pump operability and flow rate limitation, and other LTOP controls. Technical Specification 3.4.9.3.a is further revised to require system vents equivalent to the number of PORVs not available. The controls of the proposed Technical Specification are not applicable if a system vent area equal to or greater than eight square inches exists. Eight square inches is a flow area which can provide protection from the inadvertent injection from any combination of operable pumps and therefore the protection requirements in the LCO are not required. ACTION STATEMENT changes are proposed to decrease the time to restore an inoperable PORV to OPERABLE status from

7 days to 5 days and to increase the time permitted to vent the RCS from 8 hours to 48 hours. This change is proposed to establish a more practicable time for cooldown and depressurization (based on past operational experience). Since the proposed change decreases the total time a PORV could be out of service before a vent is established in the RCS from 7 days 8 hours to 7 days, the proposal is acceptable.

Proposed Technical Specifications 3.4.9.3.b and 3.4.9.3.c and ACTION STATEMENTS d and e are added to specify the disabling of two HPSI pumps and to prevent the automatic alignment of HPSI pump flow to the RCS. In addition, Proposed Technical Specification 3.4.9.3.d and ACTION STATEMENT f are added to limit the HPSI flow to less than or equal to 210 gpm in accordance with the analyzed conditions and to provide appropriate actions if the specified flow is exceeded while pump suction is aligned to the Refueling Water Tank and a RCS vent less than or equal to 2.6 square inches exists. These proposed changes are acceptable based on the supporting analysis.

Surveillance Requirement 4.4.9.3.3 is added to verify the conditions in the proposed LCO for Technical Specification 3.4.9.3 and is acceptable. Since the current Surveillance Requirement 4.5.3.2 dealing with ECCS subsystems would be redundant if 4.4.9.3.3 is adopted, the proposed deletion of 4.5.3.2 is acceptable.

Technical Specification 3.4.1.3, "COOLANT LOOPS AND COOLANT RECIRCULATION - SHUTDOWN," concerns RCP controls. To accommodate the LTOP conditions for Modes 4 and 5, a footnote appended to the APPLICABILITY of the LCO is revised to require that an RCP not be started when an RCS cold leg temperature is less than or equal to 327°F unless (1) the pressurizer indicated water level is less than or equal to 165 inches, (2) the secondary water temperature of each steam generator is less than or equal to 30°F above the RCS temperature, and (3) the pressurizer pressure is less than or equal to 300 psia by plant computer indication or equivalent precision instrument. The footnote also specifies that the restrictions are only valid for the current shutdown condition and that entry into Mode 2 will not occur until the restrictions have been revised. These changes reflect the analysis assumptions for the limiting energy addition transient discussed above and are acceptable.

Technical Specification 3.1.2, "BORATION SYSTEMS," concerns the use of a HPSI pump to provide a source of boron injection in Modes 5 and 6. To provide protection against overpressurization from inadvertent HPSI injection while borating, a footnote to LCOs 3.1.2.1 and 3.1.2.3 is proposed to define an operable pump as being in pull-to-lock and states that HPSI pump manual use is in accordance with approved procedures under the restrictions of Specification 3.4.9.3.d. This is the same as a footnote to Item a. of LCO 3.5.3, "ECCS SUBSYSTEMS," which was approved by Amendment No. 140 to Facility Operating License No. DPR-53 for the Calvert Cliffs Unit No. 1, March 6, 1990, and is acceptable since it is consistent with the assumptions in the LTOP analysis provided in this amendment request. Amendment No. 140 also approved a change to Technical Specification Table 3.3-3 related to manual operation of the HPSI pump. Further clarification is proposed in the current amendment request to allow an operating temperature band between 350°F to 327°F for disabling the pumps. This additional clarification is to define the previously reviewed and accepted range. This change is acceptable since it provides additional guidance to assure conformance to the Technical Specification requirements.

Technical Specification 3.5.3, "ECCS SUBSYSTEMS," will be modified to identify the new LTOP enable temperature of 327°F in LCO 3.5.3.a. A footnote is proposed to the Surveillance Requirement 4.5.2, "EMERGENCY CORE COOLING SYSTEMS," to allow full flow testing of a HPSI pump at RCS temperatures less than or equal to 327°F as long as the HPSI pump is recirculating RCS water. The proposed footnote is acceptable since it limits the mass addition from a HPSI pump to analyzed limits.

Based on our evaluation, the staff has determined that the licensee proposed changes to Technical Specification LCOs 3.4.9.1, 3.4.9.3, 3.4.1.3, 3.1.2, and 3.5.3, Surveillance Requirements 4.4.9.3.3 and 4.5.2, Table 3.3-3, and their associated Bases are acceptable to support the Appendix G pressure/temperature limits applicable for a period up to 12 EFPY.

5.0 STATEMENT OF EMERGENCY CIRCUMSTANCES

The licensee's July 18, 1990 submittal requested that the amendment, as modified, be approved on an emergency basis. The licensee has scheduled outage activities which include extensive pipe replacement, repairs, and maintenance work on the salt water service system (SWSS). The current plant conditions require that both trains of the SWSS be available to remove decay heat. An alternate source of decay heat removal is necessary to allow the SWSS train to be taken out of service so that the pipe replacement, repairs, and maintenance can be performed. The alternate source of decay heat removal is a reactor coolant system (RCS) loop which requires the unit to operate in Mode 3 or 4 to allow an RCS Loop steam generator to remove decay heat. The current plant condition, Mode 5 with the RCS vented (pressurizer manway removed), does not allow use of this alternative decay heat removal source. The LTOP protection provided by this amendment is needed to secure the RCS and operate the unit at temperatures and pressures necessary for an operable RCS loop and to remove decay heat via its steam generator. This alternate decay heat removal source will permit the removal-from-service of the SWSS train. Each day's delay in the issuance of this amendment will result in a corresponding day's delay in the startup of the unit.

10 CFR 50.91(a)(5) provides the necessary requirements for issuing an amendment when the Commission finds that an emergency situation exists and failure to act in a timely way would result in derating or shutdown of a nuclear plant or in prevention of either resumption of operation or of increase in power output up to the plant's licensed power level. The Commission expects its licensees to: apply for license amendments in a timely fashion; not abuse the emergency provisions by failing to make a timely application of the amendment and thus itself creating the emergency; provide an explanation as to why the emergency situation occurred; and why it could not have been avoided.

The licensee indicated that the circumstances leading to this emergency request could not have reasonably been foreseen. The initial amendment request was submitted on May 14, 1990, and adequate time was available to pre-notice and issue the amendment under normal circumstances. An NRC Information Notice No. 89-32, "Surveillance Testing of Low Temperature Overpressure Protection Systems," was issued on March 6, 1989, which identified problems in testing PORVs and potential times assumed in analyses for LTOP protection. The licensee had performed reviews of LTOP issues and concerns between October 1989 and April 1990, however, this effort primarily focused on the initial LTOP design and restoration of the LTOP system to its initial design requirements. The licensee's efforts related to the information notice resulted in the licensee performing additional analysis and confirmatory testing to assure that the unit 1 PORV opening times assumed in the initial amendment request were adequate. The results of the effort indicated that no changes were necessary in relation to the PORV timing issue. Had factors unrelated to the PORV issue not arisen (discovery of non-conservative assumptions and errors in input to the computer calculations), the amendment as initially requested would have been issued.

In May 1990, the latter part of the licensee's effort related to the information notice and resolution of other LTOP issues, the licensee identified non-conservative assumptions used in performing its LTOP analysis and errors in the input to the RETRAN computer calculations. The licensee informed the staff in late June 1990 of potential non-conservatisms and errors in the analysis. As a result, the licensee requested that the issuance of the amendment be held pending resolution. The licensee enlisted the assistance of Combustion Engineering to confirm the results of its re-evaluation of the mass addition and energy addition transient analyses performed to support the LTOP portion of the amendment request and the licensee promptly submitted its July 18 submittal after completing the necessary analyses.

The staff finds that the licensee has acted in good faith and made a timely application for revising portions of the LTOP related TS after discovering and evaluating the deficiencies in its LTOP analysis and errors in its calculations. Further, the staff finds that the amendment is needed to allow completion of activities during the current outage that are required for startup.

Corrective actions are being taken to preclude recurrence of this type of emergency. The licensee is assessing the circumstances and root causes leading to the emergency situation to assure improved process and administrative controls are being put in place.

Based on the above, the Commission has determined that the licensee has not abused the emergency provisions of 10 CFR 50.91(a)(5); failure for the Commission to act on the licensee's request would result in a delay in the resumption of power operation of the unit; and therefore, the request should be processed under the emergency provision of 10 CFR 50.91(a)(5).

6.0 SUMMARY

The staff has concluded, based on the discussions included in Sections 3.0 and 4.0 above, that the proposed Technical Specifications supporting the new 12 EFPY P/T limits and the LTOP controls are acceptable. Further, based on the discussion in Section 5.0, a determination has been made that the licensee has acted in good faith and justified the need for emergency action.

7.0 FINAL DETERMINATION OF NO SIGNIFICANT HAZARDS CONSIDERATION

The proposed changes to the Calvert Cliffs, Unit 1, Technical Specifications as initially requested by letter dated May 14, 1990, and noticed in the Federal Register on May 30, 1990, (55 FR 21962), were grouped as follows:

Change 1: Changes proposed to the heatup and cooldown curves

Change 2: Changes proposed to adjust the LTOP controls

Change 3: Changes proposed to modify the RCP controls

Change 4: Changes proposed to clarify HPSI operability

Change 5: Changes proposed to modify HPSI pump controls

As noted in Section 2.0 of this SE, the July 18, 1990 submittal only modified certain TS change requests associated with proposed changes to Change 2 (changes proposed to adjust LTOP controls) and Change 3 (changes proposed to modify HPSI controls). Specifically, for Change 2, the submittal revised the TS 3.4.1.3 footnote on applicability for Modes 4 and 5. This changed the pressurizer water level to less than or equal to 165 inches, the secondary water temperature of each steam generator to less than or equal to 30°F above the RCS temperature, and added a requirement for pressurizer pressure of less than or equal to 300 psia by plant computer indication or equivalent precision instrument. The footnote further indicated that the restrictions are only valid for the current shutdown condition and that entry into Mode 2 will not occur until the restrictions have been revised. The associated TS bases pages were updated to reflect these proposed changes.

The submittal modifications related to Change 3 revised TS 3.4.9.3.d and f which specified that the HPSI flow shall be limited to equal to or less than 210 gpm. Section f also indicates that, if the flow is exceeded while suction is aligned to the RWT and an RCS vent of less than 2.6. square inches exists, immediate action must be taken to reduce flow to less than or equal to 210 gpm. The associated TS bases pages were updated to reflect these proposed changes.

Because these changes were not encompassed by the Federal Register notice published on May 30, 1990 and the changes were needed to prevent delay in startup of the Unit, the licensee requested that the portions of the proposed amendment which were modified by its July 18, 1990 submittal be approved on an emergency basis. The details relating to the circumstances leading to the changes and request for emergency action by the staff are detailed in Section 5.0 above. Since no comments have been received on the initial notice, the staff's final determination in relation to significant hazards consideration addresses only those proposed changes that are impacted by the July submittal (Changes 2 and 3) and are the subject of the emergency request.

The Commission has provided standards for determining whether a significant hazards consideration exists (10 CFR 50.92(c)). A proposed amendment to an operating license for a facility involves no significant hazards consideration if operation of the facility in accordance with the proposed amendment would not: (1) involve a significant increase in the probability or consequences or an accident previously evaluated; or (2) create the possibility of a new or different kind of accident from any accident previously evaluated; or (3) involve a significant reduction in a margin of safety.

The following evaluation addresses the three standards in relation to Change 2 and 3.

First Standard - Involve a significant increase in the probability or consequences of an accident previously evaluated.

Change 2 - LTOP Controls

The PORV pressure setpoint and enable temperature have been adjusted based on the current 12 EFPY analysis and have been selected in accordance with 10 CFR Part 50, Appendix G, including applicable NRC staff guidance. LTOP controls are not required if adequate venting is available. It has been determined, and reflected in the TS, that additional LTOP protection is not required if a vent of 8 square inches is available.

The analysis performed conservatively assumed only one PORV available and the requirement to have a vent equivalent to an out-of-service PORV when LTOP protection is needed provides assurance against a single failure during a postulated LTOP transient. More conservative restrictions have been imposed on the amount of time that a PORV can be out of service before a vent is opened in the RCS. Increased depressurization time also provides assurance that adequate time is available for operators to make the transition from water solid to vented conditions which minimizes the likelihood of an LTOP transient occurring.

The limiting of the available mass addition sources by throttling the operable HPSI pump provides assurance that the Appendix G limits will not be exceeded while maintaining a HPSI pump available for required uses. The safety-related function of the throttled HPSI pump for other design basis events was evaluated and a determination made that the proposed throttled value provides, with margin, sufficient flow to mitigate the postulated design basis events.

Change 3 - RCP Controls

The limiting transient for an LTOP energy addition transient is a spurious start of an RCP with the isolation of letdown. Controllable variables are the pressurizer pressure, pressurizer level, and energy addition from hot steam generator limits. Limits for these variables have been established, including: the pressurizer pressure; pressurizer level; and the secondary-to-primary delta T which includes consideration of associated uncertainties. The analysis performed assumed a start of two RCPs, with the proposed limits in place, and demonstrated that a PORV would not be required to open to mitigate the transient. The restrictions imposed are valid only for the current shutdown conditions and the proposed TS assures that entry into Mode 2 will not be allowed until the restrictions have been revised. This is consistent with the assumptions used in the analysis and assures safe operation. Therefore, the results of the analysis satisfy the requirements of 10 CFR Part 50, Appendix G.

Thus, we have concluded that the changes 2 and 3 as modified by the July 18, 1990 submittal, do not involve a significant increase in the probability or consequences of previously evaluated accidents.

Second Standard - Create the possibility of a new or different kind of accident from any accident previously evaluated.

Change 2 - LTOP Controls

The changes in pressure and temperature setpoints are consistent with the requirements of the 10 CFR Part 50, Appendix G curves. The out-of-service times of the PORVs, the vent sizes, depressurization time, and throttling the HPSI flow do not represent a significant change in the existing configuration of the unit. The proposed changes reflect adjustments based on the current 12 EFPY analyses. No new hardware is being added to the unit nor is existing equipment being modified. The longer cooldown will lessen the likelihood of an unforeseen situation. Finally, no different types of operations are being introduced.

Change 3 - RCP Controls

No new type of accident is created by altering the RCP start criteria in the TS. No new hardware is being added to the unit as a result of this proposed change, no existing equipment is being modified, nor are any different types of operations being introduced. RCPs are now normally, by procedure, started while a bubble is in the pressurizer. This requirement is now included in the proposed TS. The restrictions imposed are valid only for the current shutdown conditions and the proposed TS assures that entry into Mode 2 will not be allowed until the restrictions have been revised. This is consistent with the assumptions used in the analysis and assures safe opertion.

Thus, we have concluded that changes 2 and 3 as modified by the July 18, 1990 submittal, do not create the possibility of a new or different kind of accident from an accident previously evaluated.

Third Standard - Involve a significant reduction in the margin of safety.

Change 2 - LTOP Controls

The proposed changes do not involve a significant reduction in the margin of safety. The pressure and temperature setpoints were determined in accordance with 10 CFR 50, Appendix G. The established vent size was conservatively chosen to relieve flow from any possible combination, beyond which LTOP is not required, was conservatively chosen to relieve flow from any possible combination of pumps. The margin of safety for PORVs is established by requiring an equivalent amount of vent capacity when on PORV is out-of-service. The PORV out-of-service time is reduced which increases the safety margin. Increased cooldown time also lessens the likelihood of transients occurring which require LTOP protection.

Change 3 - RCP Controls

The proposed changes ensure that the margin of safety is maintained. The starting of an RCP while water solid is no longer permitted by the TS. Adequate operator response time is assured given a steam bubble in the pressurizer. The controls placed on the variables, including new controls on the system pressure, provide an additional margin of safety. The restrictions imposed are valid only for the current shutdown conditions and the proposed TS assures that entry into Mode 2 will not be allowed until the restrictions have been revised. The is consistent with the assumptions used in the analysis and assures safe operation.

Thus, we have concluded that the changes 2 and 3 as modified by the July 18, 1990 submittal, do not involve a significant reduction in a margin of safety.

Based on the foregoing, the Commission has concluded that the standards of 10 CFR 50.92 are satisfied. Therefore, the Commission has made a final determination that the proposed amendment does not involve a significant hazards consideration for changes 2 and 3, as modified by the July 18, 1990 submittal.

8.0 STATE CONSULTATION

The appropriate representative of the State of Maryland was notified of this amendment. The state of Maryland had no comments.

9.0 ENVIRONMENTAL CONSIDERATION

This amendment involves a change to a requirement with respect to the installation or use of the facilities' components located within the restricted areas as defined in 10 CFR Part 20 and to a surveillance requirement. The staff has determined that this amendment involves no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding and final determination that this amendment involves no significant hazards consideration and there has been no public comment on such finding. Accordingly, this amendment meets the eligibility criteria for categorical exclusion set forth in 10 CFR Sec 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of this amendment.

10.0 CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) the amendment will not (a) significantly increase the probability or consequences of accidents previously evaluated, (b) create the possibility of a new or different kind of accident from any accident previously evaluated, or (c) significantly reduce a margin of safety, and therefore, the amendment does not involve significant hazards consideration; (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner; and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public.

Dated: July 24, 1990

PRINCIPAL CONTRIBUTORS:

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